Algebra 2 5.0
Chapter 6 Review

Name: _____
Date: _____ Period: ____

Evaluate the following without using a calculator. (The first page of your test will be non-calculator)

1.) $\log_4 64 = X$

$4^X = 64$

$X = 3$

2.) $\log_3 \frac{1}{81} = X$

$3^X = \frac{1}{81}$

$X = -4$

3.) $6^{\log_6 9.1} =$

$X = 9.1$

4.) $\log_3 1 = X$

$3^X = 1$

$X = 0$

5.) $\log_{\frac{1}{4}} 256 = X$

$\frac{1}{4}^X = 256$

$X = -4$

6.) $\log_9 3 = X$

$9^X = 3$

$X = \frac{1}{2}$

Answer each of the following. Round you answer to the nearest hundredth when appropriate.

7.) A 470 gram sample of a radioactive substance decreases in mass by 5% each year. Write the exponential expression to represent the mass after n years. What is the mass of the sample after 8 years? Round your answer to the nearest gram.

$470(.95)^n$ $470(.95)^8 \approx 312$ grams

8.) The population of Dullsville was 7,230 in 1990 and was increasing at a rate of 1.1% per decade. Assuming that the population of Dullsville continues to increase at the same rate, find the projected population in the year 2015.

$7230(1.011)^{2.5} = 7430$ people

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9.) Using the formula $A(t) = P\left(1+\frac{r}{n}\right)^{nt}$, find the final amount of a $4000 investment after 5 years at 3% interest compounded monthly.

$4000\left(1+\frac{.03}{12}\right)^{60}$

$4000(1.0025)^{60} = \$4646.47$

10.) Write $3^4 = 81$ in logarithmic form.

$\log_3 81 = 4$

11.) Write $\log_6\left(\frac{1}{36}\right) = -2$ in exponential form.

$6^{-2} = \frac{1}{36}$

Write each expression as a single logarithm.

12.) $\log_2 12 + \log_2 5 - \log_2 4$

$\log_2 60 - \log_2 4$

$\log_2 \frac{60}{4} = \log_2 15$

$\log_2 15$

13.) $\frac{1}{2}\log_b 25 + 3\log_b z$

$\log_b 25^{\frac{1}{2}} + \log_b z^3$

$\log_b 5 + \log_b z^3 = \log_b 5z^3$

$\log_b 5z^3$

Write each expression as a sum or difference of logarithms. Then simplify if possible.

14.) $\log_3 27x$

$\log_3 27 + \log_3 x$

$3 + \log_3 x$

15.) $\log_{10}\frac{xy}{10}$

$(\log_{10} x + \log_{10} y) - \log_{10} 10$

$(\log_{10} x + \log_{10} y) - 1$

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Solve each equation for x. If necessary, round your answers to the nearest hundredth.

16.) $\log_5 x = 3$

$5^3 = x$

$x = 125$

17.) $\log_2 16 = x$

$2^x = 16$

$x = 4$

18.) $\log_4(5x - 6) = 3$

$4^3 = 5x - 6$

$64 = 5x - 6$

$5x = 70$

$x = 14$

19.) $3\log_2 4 + 4\log_2 3 - 2\log_2 6 = 2\log_2 x$

$\log_2 64 + \log_2 81 - \log_2 36 = \log_2 x^2$

$\log_2 5184 - \log_2 36$

$\log_2 144 = \log_2 x^2$

$x^2 = 144$

$x = 12$

20.) $\log_7(x+3) + \log_7 4 = 2\log_7 5$

$\log_7 4(x+3) = \log_7 25$

$4x + 12 = 25$

$4x = 13$

$x = \frac{13}{4}$

21.) $\log_2 x + \log_2(x-4) = 5$

$\log_2(x(x-4)) = 5$

$\log_2(x^2 - 4x) = 5$

$2^5 = x^2 - 4x$

$x^2 - 4x - 32 = 0$

$(x-8)(x+4) = 0$

$x = 8$ ~~$x = -4$~~

22.) $\log_4(x+1) + \log_4(x-2) = \log_4(x^2 - 9)$

$\log_4(x^2 - x - 2) = \log_4(x^2 - 9)$

$x^2 - x - 2 = x^2 - 9$

$-x - 2 = -9$

$-x = -7$

$x = 7$

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Solve each exponential function for x. Round to the nearest hundredth when necessary.

23.) $100^{2x} = 10^{3x+2}$

$10^{2(2x)} = 10^{3x+2}$

$4x = 3x+2$

$x = 2$

24.) $8^{2x+3} = 64^{x-5}$

$2^{3(2x+3)} = 2^{6(x-5)}$

$6x+9 = 6x-5$

NO SOLUTION

25.) $64^{x-1} = 4$

$4^{3(x-1)} = 4^1$

$3x-3 = 1$

$3x = 4$

$x = \frac{4}{3}$

26.) $25^{2x} = 125^{x-3}$

$5^{2(2x)} = 5^{3(x-3)}$

$4x = 3x-9$

$x = -9$

Use the change of base formula to evaluate each logarithmic expression to the nearest hundredth.

27.) $\log_8 50$ $\frac{\log 50}{\log 8}$

1.88

28.) $\log_{\frac{1}{2}} 15$ $\frac{\log \frac{1}{2}}{\log 15}$

-0.26